Agenda

- Cloud and OCP
- Intel® Platforms and Solution Innovations
- System Firmware Improvements
- Summary and Call to Action
Public Cloud Growth Continues – Driving Greater Infrastructure demands

BY 2021

Digital Retail $4.9T\(^1\)

Digital Advertising $400B\(^2\)

Digital Video & Media $120B\(^3\)

Cloud Services $300B\(^4\)

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1. Digital Retail – eMarketer Jan/March 2018
2. Digital Ads – eMarketer May 2018
3. Digital Video/media – Juniper Research, Subscription Video on Demand, Dec 2017
4. XaaS (cloud services) – IDC Public Cloud Services Tracker Forecast 2017H2, May 2018
Cloud and OCP

OCP Project(s) well-positioned to satisfy Cloud Solution Requirements
OCP TAIWAN DAY
Road to 5G · AI · Edge Computing
Intel® Platforms and Solution Innovations
New OCP Compute Platforms This Year

Mount Olympus Next Gen Platform for Cascade Lake Processor

Cooper Lake Processor Platforms

2S  4S (2x 2S)  8S (4x 2S)

*Other names and brands may be claimed as property of others.
First Cloud-Optimized Platform
2U 450mm x 780mm 4S Intel® Xeon®
6xxx VM optimized processors
48 DDR4 memory slots,
SATA/SAS/NVMe 2.5”
SSD drive bays

Available in second half 2019

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OCP Cards Support for AI Accelerators

Intel® NERVANA™ Neural Network Processor (NNP)

FOR TRAINING:
Dedicated deep learning training acceleration
Optimized memory and interconnects
In production in 2019

FOR INFERENCE:
Dedicated deep learning inference acceleration
10nm Intel® process node
In production in 2019

Intel is a proud partner of the GLOW community

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Advancing Network Performance with OCP NIC 3.0 Adapters

**Now: OCP Mezzanine cards 2.0**
- 25GbE Intel® Ethernet Network Adapters for OCP 2.0
- 1GbE and 10GbE Intel® Ethernet Network Adapters for OCP NIC 3.0
- Up to 100 GbE next gen Intel® Ethernet Network Adapter for OCP NIC 3.0

**Q3‘19: OCP NIC 3.0 Adapters**
- Complete OCP NIC 3.0 product family from 1GbE to 100GbE (1, 10, 25, 50, 100)
- Flexible port configurations

Work with us on implementing and validating your solutions

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Advancing Common SIPH Connectivity Standards

Open standard optical hardware leveraging wafer scale manufacturing
100G CWDM4-OCP shipping in volume since 2017, 400G shipping in 2019
Working to standardize electrical interfaces (die-to-die and die-to-optical) for optical I/O
and integrated networking/switch solutions
CLOUD - Managing at Scale Realities...

SW and FW Updates

Errors SW & HW

@Service Outages

@Scale Magnification
System Firmware Improvements
Cloud Firmware Update Challenges

- Today’s OCP system contains many hardware components with firmware
  - System Firmware - BIOS, BMC, etc.
  - Device Firmware - Microcode, Network, Storage, PSU, etc.
- Over life time of the system, the firmware components are upgraded to address:
  - Security, power, performance, bug fixes, debug/telemetry, etc.
- In most cases, system is rebooted to activate new firmware
Cloud Demands High Service Availability

Stop All VM and Services
Shut down OS/VMM
Reboot System with new firmware
Boot OS/VMM
Restart VMs and Services

System reboot affects the service availability

Less Service Interruption Time is better

Service Interruption Time

Intel® working with partners in OCP on improving FW Upgrades
Runtime Firmware Activation Flow

- **OS Constructs for Runtime Updates**
  - Unix/Linux - kexec
  - Windows - Memory Preserving Maintenance

- **Firmware Activation Mechanics**
  - Pause/Preserve VMs
  - Invoke Modified Reset flow
  - Activate new FW Modules
  - Load OS (memory contents still valid)
  - Resume services
Platform Runtime Mechanism (PRM)

**Using SMM**

- **OS Level Software / Driver**
- **ASL Methods**
- **ACPI Tables**

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**Platform Hardware**

- **Broadcast** - Stalling all threads. Black box – Hidden from OS.
- **HW SMI** - Privileged - Unfretted access to hardware resources and memory.

- **PRM**
  - **Readable and Auditable**
  - **Page table based access restrictions**

**PRM aims to reduce runtime SMMs**
Advancing Cloud Innovations via OCP Projects...

- Intel® High-Density, Cloud-Optimized Platform – Joint OCP contribution from Intel and Inspur
- Data Center Cooling based on Predicting Power - Plan to contribute Whitepaper and Redfish profile to OCP DCF Project
- Open System Firmware (OSF)
  - Platform Runtime Mechanism (PRM)
  - Multi-socket Firmware Support Package (FSP) & Coreboot
- Storage Disaggregation using NVMe over Fabrics (TCP/IP or RDMA)
Edge Computing

- **Edge Requirements:**
  - Remote management
  - Ease of maintenance
  - Fail in place
  - Failure Resilience

- **Intel Innovations that benefit Edge:**
  - Remote management
  - Open Firmware and firmware complexity reduction
  - Firmware resilience
  - Rack & Power management
Call to Action

- Take advantage of Intel platform and solution contributions to OCP
- Participate and contribute to OCP Projects to enhance server & DC solutions
Thank You